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WHAT IS CLAIMED IS:

1. An apparatus for mixing at least two fluids, particularly fluids having differing viscosities, the apparatus comprising:

a first fluid line for conducting an intermittently flowing first fluid and a second fluid line for conducting an intermittently flowing second fluid, the first and second fluid lines being connected at a junction to a third fluid line, which forwards the two, particularly mixed, fluids;

a first flow adjuster, inserted in the first fluid line for setting a volumetric or mass flow rate of the first fluid, and a second flow adjuster, inserted in the second fluid line for setting a volumetric or mass flow rate of the second fluid; and

means for generating a first control signal, representing an instantaneous setting value for the first flow adjuster, and a second control signal, representing an instantaneous setting value for the second flow adjuster,

the two flow adjusters being so controlled by means of the control signals that the two fluids flow into the third fluid line alternately.

2. An apparatus as set forth in claim 1 wherein the flow adjusters are so controlled by means of the control signals that at least upstream of the third fluid line, each of the two fluids flows in a pulsating manner.

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3. An apparatus for mixing at least two fluids, particularly fluids having differing viscosities, the apparatus comprising:

a first fluid line for conducting an at least intermittently flowing first fluid and a second fluid line for conducting an at least intermittently flowing second fluid, the first and second fluid lines being connected at a junction to a third fluid line, which forwards the two, particularly mixed, fluids;

a first flow adjuster inserted in the first fluid line for setting a volumetric or mass flow rate of the first fluid and a second flow adjuster, inserted in the second fluid line for setting a volumetric or mass flow rate of the second fluid;

a first flowmeter, inserted in the first fluid line for measuring a volumetric flow rate and/or a mass flow rate of the first fluid and for generating at least a first measurement signal, representing the measured flow rate of the first fluid, and a second flowmeter, inserted in the second fluid line for measuring a volumetric flow rate and/or a mass flow rate of the second fluid and for generating at least a second measurement signal, representing the measured flow rate of the second fluid, with the first meter measuring at least intermittently a totalized volumetric or totalized mass flow rate of the first fluid and generating a, particularly digital, first measured flow rate value, which represents the totalized flow rate of the first fluid; and

a first flow controller, which, using the first measurement signal, generates a first control signal, representing an instantaneous setting value for the first flow adjuster, and a second flow controller, which, using the second measurement signal, generates a second control signal, representing an instantaneous setting value for the second flow adjuster, said first and second flow controllers being connected by at least one measurement data line, and said second flow controller generating said second control signal for

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the second flow adjuster by also using the first measured flow rate value, which is transmitted over the measurement data line.

4. An apparatus as set forth in claim 3 wherein the second meter at least intermittently measures a totalized volumetric or mass flow rate of the second fluid and generates a, particularly digital, second measured flow rate value, representing the totalized flow rate of the second fluid.

5. An apparatus as set forth in claim 4 wherein the first flow controller generates the first control signal for the first flow adjuster by also using the second measured flow rate value, which is transmitted over the measurement data line.

6. An apparatus as set forth in any one of the preceding claims wherein the flows of the first fluid and/or the second fluid are discontinuous and particularly pulsating.

7. An apparatus as set forth in any one of the preceding claims wherein the flows of the first fluid and/or the second fluid are set to a value other than zero in timed sequence.

8. An apparatus as set forth in any one of the preceding claims wherein the flows of the first and second fluids are alternately set to a value other than zero.

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9. An apparatus as set forth in any one of the preceding claims wherein the first flow controller at least intermittently receives a, particularly digital, reference input signal representing an instantaneous set point for the flow rate of the first fluid.

10. A process for producing a fluid mixture of predetermined mass and/or predetermined volume by mixing a first fluid, held in a first fluid line, and a second fluid, held in a second fluid line, the process comprising the steps of:

causing the first fluid to flow into a third fluid line, which is at least intermittently connected to the first fluid line; and

causing the second fluid to flow into the third fluid line, which is also at least intermittently connected to the second fluid line,

said steps of causing the first and second fluids to flow into the third fluid line being performed alternately and repeated several times.

11. A process as set forth in claim 10, comprising the further step of measuring a volumetric or mass flow rate in at least one of the three fluid lines.

12. A process as set forth in claim 10 or 11, comprising the further step of measuring a fluid density in at least one of the three fluid lines (L1, L2, L3).

13. A process as set forth in any one of claims 10 to 12, comprising the further step of measuring a fluid viscosity in at least one of the three fluid lines.

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14. A process for producing a fluid mixture of predeterminable mass and/or predeterminable volume by mixing a first fluid, held in a first fluid line, and a second fluid, held in a second fluid line, the process comprising the steps of:

causing the first fluid to flow into a third fluid line, which is at least intermittently connected to the first fluid line;

measuring a volumetric or mass flow rate of the first fluid and generating a first measurement signal, which represents the measured flow rate of the first fluid;

measuring a totalized volumetric or mass flow rate of the first fluid and generating a first measured flow rate value, which represents the totalized flow rate of the first fluid;

determining an instantaneous set point for a totalized volumetric or mass flow rate of the second fluid; and

causing the second fluid to flow into the third fluid line at least until the totalized volumetric or mass flow rate of the second fluid reaches the set point.

15. A process as set forth in claim 14, comprising the further step of measuring a volumetric or mass flow rate of the second fluid and generating a second measurement signal, which represents the measured flow rate of the second fluid.